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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

BELLO, AGUSTIN

ART UNIT	PAPER NUMBER
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2633

14

DATE MAILED: 05/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/248,103

Applicant(s)

NAKAZAWA ET AL.

Examiner

Agustin Bello

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 February 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-89 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-89 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-15, 18-22, 25-32, 35-59, 62-68, and 71-89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gaudino's article "A Novel AOTF-Based Multichannel Add-Drop Node and its Cascadability in WDM Ring Networks" in view of Thompson (U.S. Patent No. 6,031,852).

Regarding Claims 1, 3, 4, 6-9, 35-36, 39-40, 43-45, 48-50, 59, 78, 79, 80, 86, 87, 88, 89, Gaudino teaches an apparatus comprising: first and second acousto-optical tunable filters (AOTF) cascaded together so that the second filter filters light output from the first filter (see Figure 1), the first and second filters having filtering characteristics controlled in accordance RF signals applied thereto (as noted by Gaudino in the last paragraph of page 77). Gaudino differs from the claimed invention in that Gaudino fails to specifically teach that the phase of a beat generated by the RF signals applied to the first optical filter is different than a phase of a beat generated by the RF signals applied to the second optical filter. However, Thompson, in the same field of endeavor, teaches it is well known in the art to change the phase of the RF signal input to a pair of cascaded AOTFs, thereby inherently teaching that the beats produced in each of the filters have different phases (column 6 lines 2-13). Thompson teaches that the doing so provides higher efficiency over a wide range of acoustic frequencies and deflection angles. Therefore, it would have been obvious to one skilled in the art at the time the invention was

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made to have allowed the phase of a beat generated by the RF signals applied to the first optical filter to be different than a phase of a beat generated by the RF signals applied to the second optical filter in order to increase efficiency over a wide range of acoustic frequencies and deflection angles.

Regarding Claims 2, 5, 37, 41, the combination of Gaudino and Thompson would have suggested to one skilled in the art that it would have been beneficial to have allowed the phase of a beat generated by the RF signals applied to the first optical filter to be different than a phase of a beat generated by the RF signals applied to the second optical filter in order to increase efficiency over a wide range of acoustic frequencies and deflection angles. Being that Thompson teaches an RF source that allows the phase of the input RF signal to be shifted, one skilled in the art would clearly have recognized that it would have been possible to adjust the phase difference between the beats created to any angle desired, including a value obtained by dividing 180° . Doing so would have involved only routine skill or experimentation for one skilled in the art. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have made the difference in the phase of the beats generated equal to any value desired.

Regarding Claims 10, 18, 53, 62, 64, the combination of Gaudino and Thompson teach cascading a first and second AOTF, and Gaudino further suggests that greater than two AOTFs could be cascaded (second paragraph of page 79). However, the combination of references fails to specifically teach a third AOTF cascaded with the first and second AOTFs for filtering the second output light in accordance with RF signals applied to the third optical filter for controlling filtering characteristics of the third optical filter, wherein a phase of a beat generated by the RF signals applied to the first optical filter is different than a phase of a beat generated by

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the RF signals applied to the second optical filter and a phase of a beat generated by the RF signals applied to the third optical filter. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have cascaded a plurality of filters, thereby allowing each filter to extract a particular wavelength or group of wavelengths. One skilled in the art would have been motivated to cascade a third, fourth or fifth filter to filter the second output of the first filter in order to provide a higher degree of accuracy in the extraction of a particular wavelength or group of wavelengths by narrowing the filter passband of the third filter so that the output of the filter only included the desired wavelength or group of wavelengths. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have cascaded a third optical filter from the first optical filter wherein the third optical filter creates a beat with a phase that is different from the phase of the beat created by the first filter since doing so would have provided a more accurate filter as suggested by the teachings of the combination of Gaudino and Thompson and since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art, *St. Regis Paper Co. of v. Bemis Co., 193 USPQ*.

Regarding Claim 11, 54, 63, as discussed above, the combination of Gaudino and Thompson would have suggested to one skilled in the art that it would have been possible to select and desired phase difference for the beats generated by the RF signals applied to AOTFs, being that Thompson specifically teaches the ability and mechanism to adjust the phase of the input RF signal to the AOTF. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have selected the phase between the beats generated by the RF signals to have had the same.

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Regarding Claim 12-14, 19-21, 55-57, and 66-68, the combination of Gaudino and Thompson teach cascading a plurality of AOTFs, , the AOTFs being controllable by RF signals which select particular wavelengths from a light passing therethrough. One skilled in the art would clearly have recognized that it would have been possible to selected or reject any desired wavelength passing through the AOTF by selecting the appropriate RF signal. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to selected or rejected an desired wavelength in any of the cascaded filters by selection of the appropriate RF signal.

Regarding Claim 15, 22, Gaudino teaches the first output light excludes at least two wavelengths and the second output light from the first optical filter includes the selected wavelengths (see Figure 1).

Regarding Claim 25, 31, 71, 81, 84, 85, the combination of Gaudino and Thompson teach cascading a first and second AOTF, and Gaudino further suggests that greater that two AOTFs could be cascaded (second paragraph of page 79). Thompson also teaches a phase controller controlling the phase of the RF signal applies to the first and second optical filters (inherent in the RF generator of column 6 lines 2-13). However, the combination of references fails to specifically teach a third AOTF cascaded with the first and second AOTFs for filtering the second output light in accordance with RF signals applied to the third optical filter for controlling filtering characteristics of the third optical filter, wherein a phase of a beat generated by the RF signals applied to the first optical filter is different than a phase of a beat generated by the RF signals applied to the second optical filter and a phase of a beat generated by the RF signals applied to the third optical filter. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have cascaded a plurality of filters,

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thereby allowing each filter to extract a particular wavelength or group of wavelengths. One skilled in the art would have been motivated to cascade a third, fourth or fifth filter to filter the second output of the first filter in order to provide a higher degree of accuracy in the extraction of a particular wavelength or group of wavelengths by narrowing the filter passband of the third filter so that the output of the filter only included the desired wavelength or group of wavelengths. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have cascaded a third optical filter from the first optical filter wherein the third optical filter creates a beat with a phase that is different from the phase of the beat created by the first filter since doing so would have provided a more accurate filter as suggested by the teachings of the combination of Gaudino and Thompson and since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art, *St. Regis Paper Co. of v. Bemis Co.*, 193 USPQ.

Regarding Claim 26, 27, 32, 46, 51, 72, 73, 82, 83, the combination of Gaudino and Thompson teach a phase controller which controls the phases of the RF signals input to the AOTFs. One skilled in the art would clearly have recognized that it would have been possible to set the phase difference between the AOTFs to any desired difference including setting the phase difference to be the same for each AOTF.

Regarding Claim 28-30, 74-77, the combination of Gaudino and Thompson teach cascading a plurality of AOTFs, the AOTFs being controllable by RF signals which select particular wavelengths from a light passing therethrough. One skilled in the art would clearly have recognized that it would have been possible to selected or reject any desired wavelength passing through the AOTF by selecting the appropriate RF signal. Therefore, it would have been

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obvious to one skilled in the art at the time the invention was made to select or reject a desired wavelength in any of the cascaded filters by selection of the appropriate RF signal.

Regarding Claim 38, 42, 47, 52, 58, 65, Gaudino teaches setting a first and second RF frequency to be the same (see Figure 1).

3. Claims 16, 17, 23, 24, 33, 34, 60, 61, 69, and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gaudino's article "A Novel AOTF-Based Multichannel Add-Drop Node and its Cascadability in WDM Ring Networks" in view of Thompson (U.S. Patent No. 6,031,852) and Cheung (U.S. Patent No. 4,906,064).

Regarding Claim 16, 23, 33, 60, 69, the combination of references differs from the claimed invention in that it fails to specifically teach that the cascaded AOTFs are formed on the same substrate and that a reflective element is incorporated onto the same substrate. However, one skilled in the art would clearly have recognized that incorporating a plurality of elements onto a single substrate would have reduced the size of the system and overall cost of producing the system. Cheung, in the same field of endeavor, teaches it is well known to cascade a plurality of AOTFs with a plurality of reflective devices in order to form a switching system wherein an optical signal filtered by a first AOTF is reflected to a third AOTF, while a signal transmitted by the first AOTF is filtered by a second AOTF. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have cascaded a plurality of AOTFs and reflective devices as taught by Cheung in order to create a switching system and to have produced these elements on the same substrate in order to reduce the size and cost of the system.

Regarding Claim 17, 24, 34, 61, 70, the combination of references and Cheung in particular teach that the filtered signals are prevented from being reflected back to the first optical filter being that the reflection of the signals is polarization dependent.

Response to Arguments

4. Applicant's arguments filed 2/20/03 have been fully considered but they are not persuasive. The applicant argues that the combination of Gaudino and Thompson do meet the limitations of the claimed invention. However, the examiner disagrees. The combination of cited references clearly would have suggested the limitations of the claimed invention to one skilled in the art. As stated in the office action, Gaudino clearly teaches the cascading of AOTFs, a well known acousto-optic device. Furthermore, Thompson teaches that it is well known in the art to change the phase of RF signals input to independent acousto-optic devices, thereby changing the phase of the beats generated by the acousto-optic devices. These disclosures by both Gaudino and Thompson clearly would have suggested to one skilled in the art that it would have been possible to change the phase of the RF signals input to the cascaded acousto-optic devices taught by Gaudino, thereby changing the phase of the beats generated by the RF signals. Moreover, the examiner does not rely on Thompson to teach the cascaded AOTFs or the method by which signals are added or dropped. These limitations are clearly met by Gaudino. However, the examiner does rely on Thompson to teach that different RF signals, when input to independent acousto-optic devices (AOTF being well known acousto-optic devices), cause the phase of the beat generated by the RF signals to be different.

Next, applicant argues that the combination of Gaudino and Thompson would not have suggested to one skilled in the art that it would have been possible to set the difference in the phase of beats generated by the RF signals input to the acousto-optic devices. However, the

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examiner believes that one skilled in the art would have been able to change the phase of the RF signals, as taught by Thompson, input to the acousto-optic devices taught by Gaudino. As such it is clear that through routine experimentation, one skilled in the art would have found settings for the phases of the RF signals input to the acousto-optic devices which yielded favorable results in form of the beats generated by the input RF signals. Therefore, it is clear that one skilled in the art would have had the option of choosing the phase of the signals input to the acousto-optic devices, and thereby the phase of the beats produced by the input RF signals. It is clear that one skilled in the art could have selected a phase of the signal input to the acousto-optic devices that would have resulted in a difference in the phase of the beats being equal to a value obtained by dividing 180 by the number of stages.

Applicant argues that the combination of Thompson and Gaudino, and Gaudino in particular, fails to specifically teach or suggest that more than two AOTFs can be cascaded. However, Gaudino teaches that the issue of cascadability was studied by placing an add/drop node in a recirculating loop wherein signals were continuously recirculated through the add/drop node until a specific acceptable error threshold was met. Gaudino's experiment clearly showed that a signal could be recirculated repeatedly through the add/drop node at least 7 times before reaching the error threshold $Q > 6$, thereby clearly suggesting that up to 7 of Gaudino's AOTFs could be cascaded before a signal input to those AOTF reached the error threshold of $Q > 6$. Furthermore, Thompson clearly teaches that the phase of the signals input to acousto-optical devices, AOTFs being well known acousto-optic devices, can be changed from one device to the next with the result being a difference in the phase of the beats generated by the acousto-optic devices.

Regarding applicant's argument that the combination of Gaudino, Thompson, and Cheung fails to specifically teach or suggest that all elements are formed on a single substrate, the examiner believes that forming a plurality of optical elements on a single substrate is well known in the art and would have been obvious in order to reduce the size and cost of the system. Furthermore, Cheung specifically teaches that there are a variety of possible implementation schemes for his system. One of the specific schemes mentioned is the use of integrated optics (column 5 lines 11-15). Clearly, this would have suggested to one skilled in the art that it would have been possible to integrate all the optics of the combination of references onto a single substrate in order to reduce the size, complexity and cost of the system.

5. In response to applicant's argument that Gaudino and Thompson are nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Gaudino discloses a plurality of cascaded acousto-optic devices (e.g. AOTFs) while Thompson related to the use of acousto-optical devices wherein the phase of an input RF signal varies. Since Gaudino teaches cascading acousto-optic devices and Thompson teaches methods of controlling acousto-optical devices, it is clear that both references are related to the same field of endeavor.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (703)308-1393. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703)305-4729. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9314 for regular communications and (703)872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-3900.

AB

May 4, 2003


LESLIE PASCAL
PRIMARY EXAMINER